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ALPHANUMERIC CHARACTERS DETECTION ON LICENSE PLATE USING IMAGE PROCESSING

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ABSTRACT

This paper introduces a method of vehicle license plate (VLP) detection technique. Detecting the license plate plays a major role in the traffic surveillance. This system could be implemented in different areas like Parking, traffic signals, and mostly where the Security issues are needed.The extraction and recognition of the vehicle license plate is done using Matlab. The images are taken from the digital camera. The alphanumeric on the vehicle license plate is extracted and recognized using the database of the alphanumeric characters. The extracted characters on the vehicle license plate are printed on notepad for verification purpose.

KEYWORDS: Image Processing (IP), Character Segmentation (SC), Image Acquisition (IA)

INTRODUCTION

Character recognition is a hotspot in the image processing research field. Many algorithms have been developed for recognition of vehicle license plate, but each has their own advantages and disadvantages. Images of a license plate are taken from fixed inclination when the vehicle is stand-still as well as in motion. The image which is taken from certain inclination, those characters on the license plate are seems to overlapping over thenext character. Initially, the characters which are overlapped should be separated to increase recognition accuracy of the character. The images are taken from the digital camera at different luminous conditions.

The license plate recognition has the wide range applications like attraffic signal, no-parking areas etc. The overall detection and recognition of the license plate is as follows [1]:

- Acquisition of images- camera's pixel range should be high to get a better accuracy or results.
- Pre-processing stages, and
- Finally recognition of the alphanumeric characters.

Each segmented character should be compared with the ground truth samples. To increase the accuracy percentage of the recognition of the character the ground truth samples should be in different fonts.The different fonts of the data sets are created to increase the maximum correlation between the data set samples and the detected alphanumeric characters; thereby the character recognition accuracy is raised.

METHODOLOGY

The image's acquisition i.e. the camera should be arranged at an appropriate angle so that the entire range of the road or path of the signal jump should be covered for proper surveillance. The images which are taken from the camera are

continuously transferred to the ground control station and stored in the separate directory. The images which are stored are undergone for the preprocessing stages. During the preprocessing stages the unwanted noise is removed. The region of interest is selected in such a way that the noise is removed and the license plate is located in that area. Each character should be segmented properly with the bounding box. In case of the inclination of image acquisition the characters may or may not be overlapping. In case of overlapping the character, each alphanumeric character should be segmented properly this increases the recognition accuracy percentage.

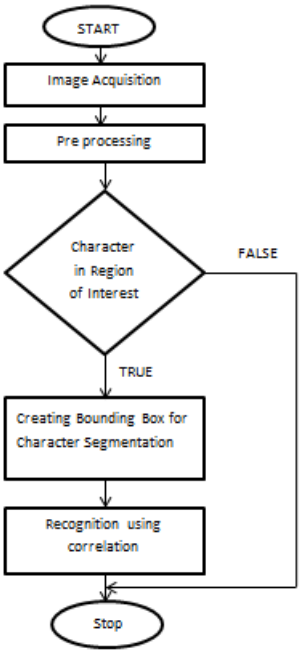


Figure 1: Flow Chart – Methodology

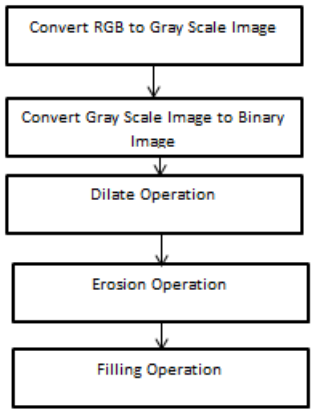
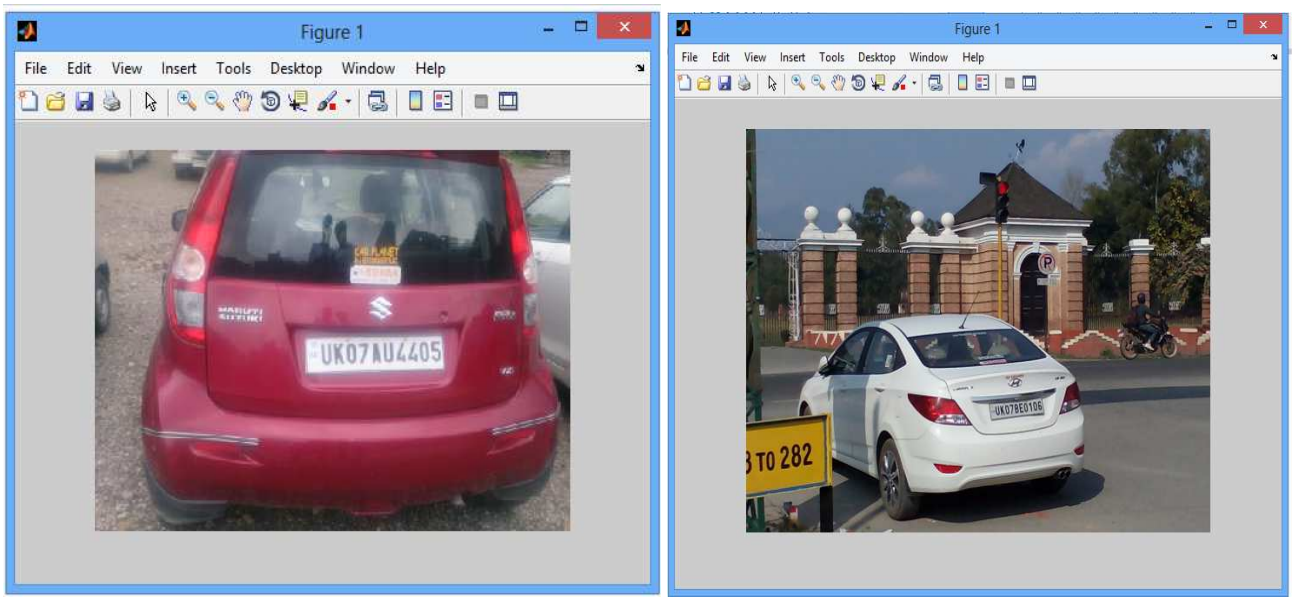


Figure 2: Pre-Processing Stages

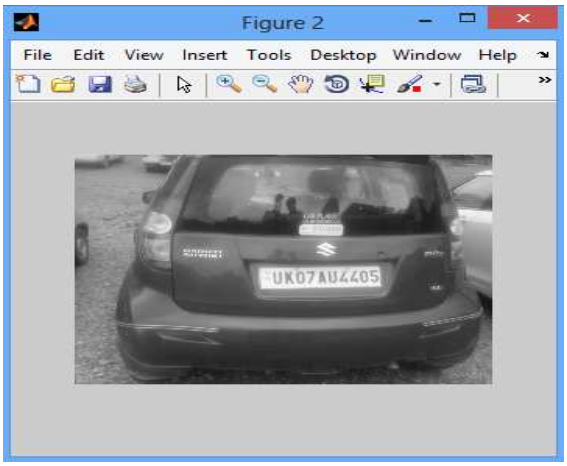
Step 1: Image Acquisition



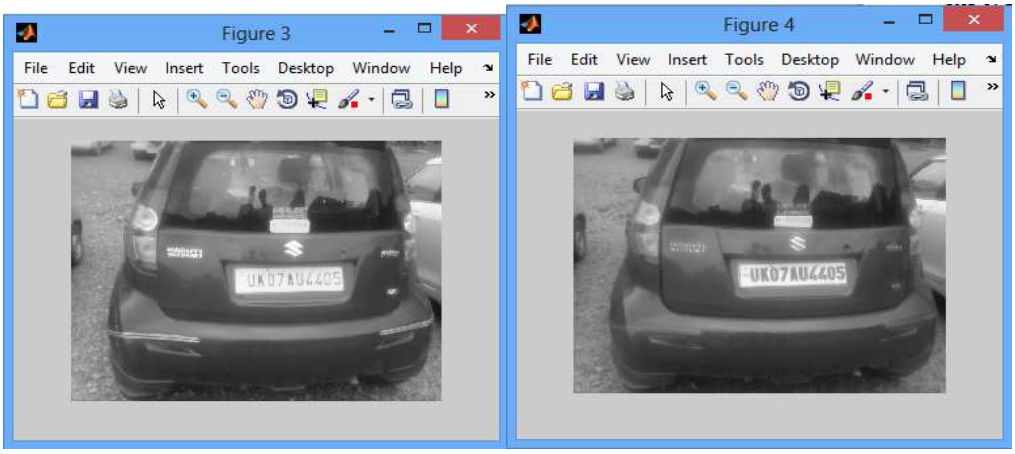
(i) (ii)

Figure 3: Image Acquisition (i) Standstill Images (ii) Inclination Images

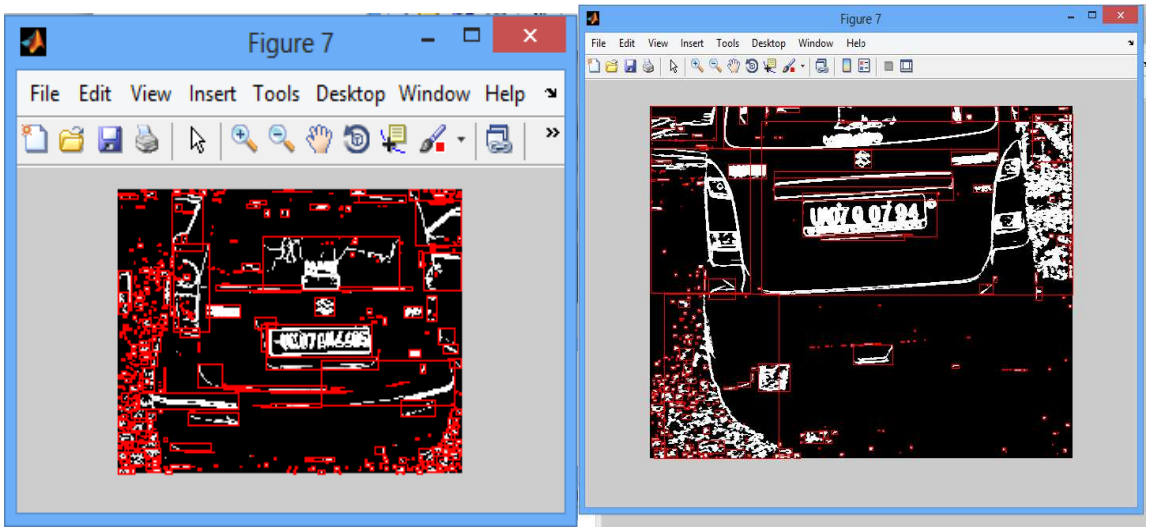
Step 2: Preprocessing Stages



(i)



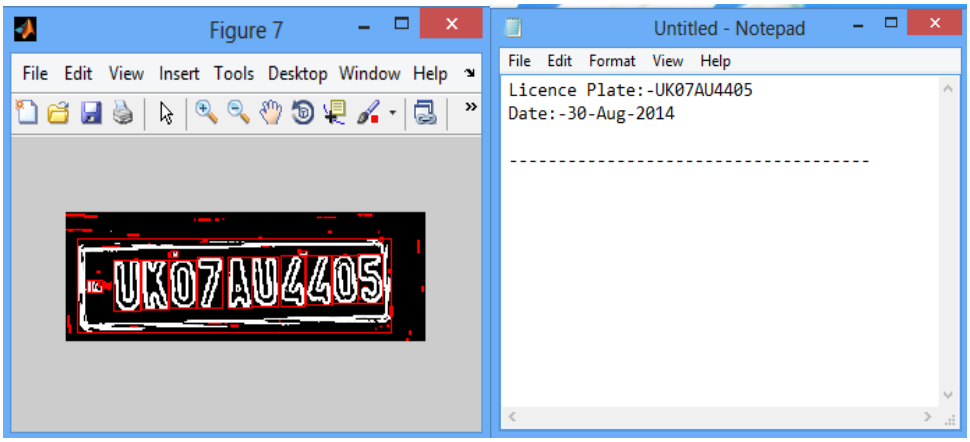
(ii) **(iii)**



(iv) **(V)**

Figure 4: Preprocessing Stages of an Image (I) Binary Image, (II) Dilation Operation, (III) Erosion Operation, (IV) Region of Interest- Inclined Image, (V) Region of Interest- Inclined Image

RESULTS



(i) **(ii)**

Figure 5: (i) Character Segmentation, (ii) Recognized License Plate Characters is printed on the Notepad

Table 1: Experimentation Results

S No	Nature of the Sample Images	Total Number of Sample Images	Total Number of Detected License Plates From Sample Images	Success Rate (%)
1.	Standstill Images	225	212	94.6
2.	Inclined Images	230	196	85.21
3.	Black coloured Characters on White coloured license Plate	355	341	96.61
4.	Black Coloured Characters on Yellow Coloured license plate	100	89	89

CONCLUSIONS

This paper describes the method of extraction and recognition of the vehicle license plate. The method used in this paper for character recognition differs from other methods in its characteristics and also explains about how to improve the extraction and recognition accuracy.

- The accuracy percentage wasmaximum when the license plate with black coloured characters on white background.
- The accuracy will increase when there is no extra light while capturing the license plate image.
- The recognition accuracy will increase without any half erased / half printed characters present on the license plate.

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